Journal of Medicine and Medical Sciences Vol. 12(4) pp 1, November 2021
DOI: http:/dx.doi.org/12.14303/jmms.2021.e006
Available online http://www.interesjournals.org/JMMS

Editorial

Radioimmunoassay in the fields of Radio

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A radioimmunoassay (RIA) is an immunoassay that uses radiolabeled molecules during a stepwise formation of immune complexes. A RIA may be a very sensitive in vitro assay technique wont to measure concentrations of drugs , usually measuring antigen concentrations (for example, hormone levels in blood) by use of antibodies

Principle of Radioimmunoassay

It involves a combination of three principles.

1. An immune reaction i.e. antigen, antibody binding.
2. A competitive binding or competitive displacement reaction. (It gives specificity)
3. Measurement of radio emission. (It gives sensitivity)

Classically, to perform a radioimmunoassay, a known quantity of an antigen is formed radioactive, frequently by labeling it with gamma-radioactive isotopes of iodine, like 125-I, attached to tyrosine. This radiolabeled antigen is then mixed with a known amount of antibody for that antigen, and as a result, the 2 specifically bind to at least one another. Then, a sample of serum from a patient containing an unknown quantity of that very same antigen is added. This causes the unlabeled (or "cold") antigen from the serum to compete with the radiolabeled antigen ("hot") for antibody binding sites. As the concentration of "cold" antigen is increased, more of it binds to the antibody, displacing the radiolabeled variant, and reducing the ratio of antibody-bound radiolabeled antigen to free radiolabeled antigen. The bound antigens are then separated and therefore the radioactivity of the free(unbound) antigen remaining within the supernatant is measured employing a gamma counter.

This method are often used for any biological molecule in theory and isn't restricted to serum antigens, neither is it required to use the indirect method of measuring the free antigen rather than directly measuring the captured antigen. For example, if it's undesirable or impossible to radiolabel the antigen or target molecule of interest, a RIA are often done if two different antibodies that recognize the target are available and therefore the target is large enough (e.g., a protein) to present multiple epitopes to the antibodies. One antibody would be radiolabeled as above while the opposite Coronary artery disease and stroke account for 80% of CVD would remain unmodified. The RIA would begin with the "cold" unlabeled antibody being allowed to interact and bind to the target molecule in solution. Preferably, this unlabeled antibody is immobilized in how , like coupled to an agarose bead, coated to a surface, etc. Next, the "hot" radiolabeled antibody is allowed to interact with the primary antibody- target molecule complex. After extensive washing, the direct amount of radioactive antibody bound is measured and therefore the amount of target molecule quantified by comparing it to a reference amount assayed at an equivalent time. This method is analogous in theory to the non- radioactive sandwich ELISA method.

Uses of Radioimmunoassay in the fields of isotopes radio set

1. The test are often wont to determine very small quantities (e.g. nanogram) of antigens and antibodies in the serum.
2. The test is used for quantitation of hormones, drugs, HBsAg, and other viral antigens.
3. Analyze nanomolar and picomolar concentrations of hormones in biological fluids.